

AMENDMENT TO THE CLAIMS

1. (Currently Amended) A flow diagnostic system adapted to couple to a primary flow sensing element via impulse lines, the flow diagnostic system comprising:

- a pressure transmitter coupled to the impulse lines and generating digital pressure data representing pressure;
- a control system receiving the pressure data and providing the pressure data ~~and real time clock readings associated with pressure data~~ to a diagnostic application stored in the flow diagnostic system, the diagnostic application including:
 - a first algorithm calculating a difference between the pressure data and a moving average of the pressure data, the moving average based upon weighted pressure data, and
 - a second algorithm receiving the difference and calculating a trained data set of historical pressure data during a training mode and calculating a current pressure data set during a monitoring mode, the historical data comprising statistical data as a function of the difference and the current data comprising statistical data calculated as a function of the difference, and the second algorithm further generating diagnostic data as a function of the current pressure data set relative to the historical pressure data indicating changes in the condition of flow sensing, and
 - a third algorithm generating a report indicating the diagnostic data.

2. (Original) The flow diagnostic system of Claim 1 wherein the diagnostic application is stored in the control system.

3. (Original) The flow diagnostic system of Claim 2 further comprising a network coupled to the control system, and the network provides the diagnostic application to the control system.

4. (Original) The flow diagnostic system of Claim 3 wherein the network includes an application service provider (ASP), and the ASP provides the diagnostic application to the control system via the network.

5. (Currently Amended) The flow diagnostic system of Claim 3 wherein the pressure data ~~and associated real time clock reading~~ are temporarily stored in the control system and later coupled via the network to the diagnostic application.

6. (Currently Amended) The flow diagnostic system of Claim 1 further comprising an application service provider (ASP) wherein the control system provides the pressure data ~~and the associated real time clock readings~~ to the ASP, and the diagnostic application is stored in the ASP.

7. (Currently Amended) The flow diagnostic system of Claim 1 wherein the pressure transmitter provides ~~the~~ real time clock readings to the control system.

8. (Currently Amended) The flow diagnostic system of Claim 1 wherein the control system generates ~~the~~ real time clock readings.

9. (Currently Amended) The flow diagnostic system of Claim 1 further comprising a remote computer wherein the control system

provides the pressure data ~~and the associated real time clock readings~~ to the remote computer, and the diagnostic application is stored in the remote computer.

10. (Original) The flow diagnostic system of Claim 1 wherein the moving average is calculated according to the series

$$A_j = \sum_{k=0}^m (P_{j+k}) (W_k)$$

where A is the moving average, P is a series of sensed pressure values, and W is a weight for a sensed pressure value, m is a number of previous sensed pressure values in the series.

11. (Canceled)

12. (Original) The flow diagnostic system of Claim 1 wherein the diagnostic data indicates a real time condition of a pressure generator including a primary element and impulse lines.

13. (Original) The flow diagnostic system of Claim 1 wherein the diagnostic data indicates a condition of the primary flow element.

14. (Original) The flow diagnostic system of Claim 1 wherein the diagnostic data indicates a condition of the impulse lines.

15. (Original) The flow diagnostic system of Claim 1 wherein the pressure data comprises a calibrated output, and the diagnostic data indicates if a pressure generator including a primary element and impulse lines is out of calibration.

16. (Original) The flow diagnostic system of Claim 1 wherein the trained data set of historical data comprises power spectral density of the difference.

17. (Original) The flow diagnostic system of claim 16 wherein the power spectral density data is in the range of 0 to 100 Hertz.

18. (Original) The flow diagnostic system of claim 1 wherein the pressure transmitter is adapted to couple to a pitot tube primary flow element.

19. (Original) The flow diagnostic system of claim 18 wherein the pitot tube is an averaging pitot tube.

20. (Original) The flow diagnostic system of claim 18 further comprising an instrument manifold coupled between the pressure transmitter and a pressure generator comprising a primary element and impulse lines.

21. (Original) The flow diagnostic system of claim 1 wherein the primary flow element and impulse lines are combined in an integral orifice.

22. (Original) The flow diagnostic system of claim 1 wherein the pressure transmitter is adapted to couple to a venturi primary flow element.

23. (Original) The flow diagnostic system of claim 1 wherein the pressure transmitter is adapted to couple to a nozzle primary flow element.

24. (Original) The flow diagnostic system of claim 1 wherein the pressure transmitter is adapted to couple to an orifice primary flow element adapted for clamping between pipe flanges.

25. (Original) The flow diagnostic system of Claim 1 further

comprising a signal preprocessor algorithm that provides an output to a signal evaluator in the first difference algorithm.

26. (Original) The flow diagnostic system of Claim 25 wherein the signal preprocessing algorithm utilizes a processing algorithm selected from the group of wavelet transformation, Fourier transformation, neural networks, statistical analysis.

27. (Original) The flow diagnostic system of Claim 25 wherein the signal preprocessing algorithm is implemented in the first differencing algorithm.

28. (Currently Amended) A computer-readable medium having stored thereon instructions executable by a flow diagnostic system to cause the flow diagnostic system to perform a diagnostic operation relative to a primary element and impulse lines couplable to a pressure transmitter, the instructions comprising:

calculating a difference between a pressure sensed by the pressure transmitter and a moving average of the sensed pressure, the moving average based upon weighted pressure data;

acquiring and storing an historical data set of the calculated difference during a training mode of the flow diagnostic system, the historical data comprising statistical data calculated as a function of the difference;

acquiring and storing a current data set of the calculated difference during a monitoring mode of the flow diagnostic system, the current data comprising statistical data calculated as a function of the difference;

comparing the current data set to the historical data set to diagnose the condition of one of the group

consisting of the primary element and impulse lines;

generating a diagnostic report indicating the condition of one of the group consisting of the primary element and impulse lines.

29. (Canceled)

30. (Currently Amended) The method of claim 2928 wherein the step of comparing includes performing a fuzzy logic operation.

31. (Currently Amended) The method of claim 2928 wherein the step of ~~calculating~~acquiring and storing a current data set comprises calculating standard deviation.

32. (Currently Amended) The method of claim 2928 wherein the flow diagnostic system comprises a differential pressure transmitter.

33. (Currently Amended) The method of claim 2928 wherein the primary element is selected from the group of primary elements consisting of a venturi tube, flow nozzle and averaging pitot tube.

34. (Currently Amended) The method of claim 2928 wherein the baseline primary element comprises a substantially new primary element.

35. (Currently Amended) The method of claim 2928 wherein the baseline impulse piping comprises new impulse piping.

36. (Currently Amended) The method of claim 2928 wherein the step of comparing ~~parameters~~ implements an algorithm selected from the

group of algorithms consisting of neural networks, fuzzy logic, wavelets and Fourier transforms.

37. (Previously Presented) The flow diagnostic system of claim 1 wherein the diagnostic data is indicative of an estimate of a residual lifetime.

38. (Previously Presented) The flow diagnostic system of claim 1 wherein the diagnostic data is indicative of a failure of a residual lifetime.

39. (Previously Presented) The flow diagnostic system of claim 1 wherein the diagnostic data is indicative of an impending failure of a residual lifetime.

40. (Currently Amended) The method of claim ~~29~~28 wherein the diagnostic ~~output~~report provides a residual lifetime estimate.

41. (Currently Amended) The method of claim ~~29~~28 wherein the diagnostic ~~output~~report is indicative of a failure.

42. (Currently Amended) The method of claim ~~29~~28 wherein the diagnostic ~~output~~report is indicative of an impending failure.